AN EXPERIMENTAL STUDY OF THE RELATIONSHIP OF LANGUAGE READING ABILITY AND THE PHYSICAL NOTATION RECCGNITION-PERFORMANCE PROCESS AS ENCOUNTERED DURING THE SIGHT-READING OF MUSIC LITERATURE BY INSTRUMENTAL MUSICIANS IN GRADES SEVEN, EIGHT, NINE, TEN, AND TWELVE.

A Thesis

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Master of Music

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by

James Dwight Hale

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Accepted by the faculty of the School of Humanities, Morehead State University, in partial fulfillment of the requirements for the Master of Music degree.

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AN EXPERIMENTAL STUDY OF THE RELATIONSHIP OF LANGUAGE READING ABILITY AND THE PHYSICAL NOTATION RECOGNITION-PERFORMANCE PROCESS AS ENCOUNTERED DURING THE SIGHT-READING OF MUSIC LITERATURE BY INSTRUMENTAL MUSICIANS IN GRADES SEVEN, EIGHT, NINE, TEN, AND TWELVE.

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Morehead State University, 1974

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The study was based on a null hypothesis which stated that there was no significant relationship between language reading ability and the physical notation recognition-performance process as encountered during the sight-reading of music literature by instrumental musicians in grades seven, eight, nine, ten, and twelve.

Experimental methods were used to collect the data used in this study. Control and experimental groups were extablished, both of which were involved in instrumental music. Student ages and grade levels of control and experimental groups were matched as evenly as possible. Both groups, control and experimental, followed similar instrumental music education programs, but a language reading improvement course was administered to the experimental group. The Baldridge Seven Reading Strategies was used as text for this improvement course. Pretests and posttests were employed for the purpose of measuring the progress of the groups instrumentally. A language reading pretest and posttest was given to the experimental group to measure the effect of the language reading improvement course. The Watkins-Farnum Performance Scale was used for the instrumental sight-reading measurements and the Diagnostic Reading

Test for the language reading course. No special emphasis was placed on musical sight-reading during the instructional process.

The null hypothesis was rejected as a result of the findings in this experiment. The fact that significant progress had been made by the experimental group in the language reading improvement course was established by the use of the t-test. A series of measurement comparisons was made and it was found that there was an extremely noticeable difference between the instrumental posttest of the control and experimental groups. It was on the basis of these findings that the null hypothesis was rejected.

The conclusion was made that there appeared to be a positive relationship between language reading ability and instrumental sight-reading ability in grade levels seven, eight, nine, ten, and twelve. Also, recommendation for further experimentation into this specific area was made.

Accepted by:

William M. Rieken, Chairman
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Also, I thank my committee, Dr. William Bigham, Dr. Douglas Engelhardt, and Dr. Frederick Mueller for the much needed criticisms and guidance during the process of the experiment and thesis writing.

Gracious appreciation of my wife, Claudine, who has sacrificed much for this period of my schooling, and has typed the greater part of this manuscript.

James Dwight Hale

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PRESENTATION OF THE PROBLEM

INTRODUCTION

There are many factors involved in the performance of a written musical composition on a musical instrument. According to Klemish, "music reading is a highly complex process that involves the auditory perception of a variety of sounds, the visual perception of symbols, and a reaction to these symbols . . . "[1] Many music educators are interested in the problem of music reading and the various factors involved in this process. This process is often a problem, and Pottenger suggests that

> Though philosophical viewpoints must also be considered, objective research should be undertaken toward specification of criterion behavior in music reading, with special attention given to questions regarding the importance, rather than the convenience of various stages in the development of music reading skill.[2]

One facet of music reading is sight-reading and some research has been done concerning this process. In terms of information concerning this process, Manzanares, Klemish, and others feel the area has been slighted. However, investigations pertaining to physical procedures involved in vision and physically sighting

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[1]Janice J. Klemish, "A Comparative Study of Two Methods of Teaching Music Reading to First-Grade Children," Journal of Research in Music Education, 18:355, Number 4, 1970.

[2]Harold P. Pottenger, "An Analysis of Rhythm Reading Skill," Dissertation Abstracts, 30:1590A-91A, October, 1969.

meaningful objects or words has been worked out in such fields as behavioral psychology and education. Manzanares, in his research involving the controlled reader (a reading device) and its application for music reading, discussed the need for research into language and music reading. Manzanares, a psychologist, stated that

> The available knowledge gained by psychologists about the sight-reading of musical notation has been, for the most part, neglected by those who develop teaching materials for the improvement of sight-reading.[3]

According to Wheeler and Wheeler, investigation into the relationship of music and language reading had been discussed by Mursell, Smith, Harris, Birge, Schneebalg, Reyburn, and others.[4] The adaptation of the principles of language reading and music reading had been discussed, omitting discussion of scientific research into the matter. It was assumed in these investigations that there existed a certain related psychological process between music reading and language reading.

Wheeler and Wheeler used a music achievement test which " . . . measures pupils' achievement in recognition of rhythm and melody from its notation."[5] It is from the preceding statement that the Wheeler and Wheeler definition of music reading was drawn.

The Wheeler and Wheeler investigation drew the conclusions

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[3]Jake Manzanares, "A Trial of the Controlled Reader as Applied to Music Reading," Dissertation Abstracts, 30:2062A-3A, November, 1969.

[4]Lester R. Wheeler and Viola D. Wheeler, "The Relationship Between Music Reading and Language Reading Abilities," Journal of Educational Research, 45:439-450, Number 6, 1952.

[5]Ibid., p. 442.

that a low positive correlation between music reading and language reading existed, but the correlations were not high enough to justify an assumption that the techniques involved in reading music were closely related to those in language reading.[6]

Kwalwasser was involved in research related to language reading abilities and music sight-reading. Discussed in his research is the Dalton study of language reading scores in comparison to music reading scores. (It should be noted that the term "music reading" is used interchangeably with the term "sight-reading" in this particular instance.) Kwalwasser's study " . . . shows considerable overlapping between the reading of language and the reading of music."[7]

Also analyzed in this Kwalwasser investigation were studies by Weaver, Bean, Jacobsen, and Ortmann. From these studies Kwalwasser concluded that " . . . it is clear that a close analogy exists between reading of words and the reading of music."[8]

A later study by Jones indicated that verbal reading ability and music reading achievement had no appreciable relationship. Recognition and recreation of music notation, either vocally or instrumentally, at first sight was the Jones definition of "music reading."[10]

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[6]Ibid., p. 447.

[7]Jacob Kwalwasser, Exploring the Musical Mind (New York: Coleman-Ross Company, Inc., 1955), pp. 155.

[8]Ibid., p. 158.

[9]Howell T. Jones, Jr., "The Relationship of Selected Factors and Music Reading Achievement," Dissertation Abstracts, 29:3632A, April, 1969.

[10]Ibid., Introduction, p. 4.

There exist certain basic physical eye movements recognized by researchers of the reading process. Gorden E. Mewes feels experience to be of importance in this area, but he suggests that " . . . the sight-reading of music notation (symbols) is also a matter of . . . a left-to-right eye movement . . . . "[11]

Researchers such as Weaver and Nuys photographed eye movements synchronized to performance of the piano. This investigation showed that one note was " . . . practically the equivalent of one word."[12] Relating to eye movement, Melnitz said that "generally, a reader is unaware of the way in which his eyes function as they follow the lines of print."[13]

Kwalwasser compiled the research of Weaver, Bean, Jacobsen, and Ortmann, and found that "efficient readers are able to grasp four or more notes at a glance while slow stumbling readers are seldom able to grasp more than one or two notes at a time."[14]

An experimental situation might be established which investigates the primary physical factors involved in the process of sight-reading of students in a secondary music program. This situation should also encompass related processes such as language reading and vision factors.

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[11]Gorden E. Mewes, "An Attempt to Determine the Association, if any, Between Crossed Dominance and Achievement Levels in Instrumental Music," Dissertation Abstracts, 31:416A, July, 1970.

[12]Wheeler and Wheeler, op. cit., 149.

[13]Kwalwasser, op. cit., 156.

[14]Ibid., p. 158.

Statement of the Problem

It was the purpose of this study to investigate the relationship of language reading ability to the physical notation recognition-performance process as encountered during the sight-reading of music literature by instrumental students in grade levels seven, eight, nine, ten, and twelve.

Null Hypothesis. There is no significant relationship between language reading ability and the physical notation recognition-performance process as encountered during the sight-reading of music literature by instrumental musicians in grades seven, eight, nine, ten, and twelve.

Specific Problems

The investigator found it necessary to locate and obtain pretest and posttest material for instrumental sight-reading and language reading ability. The validity and reliability of these measures were specified in the Mental Measurements Yearbooks.[15] Instructional time for the administration of a language reading course to the experimental group was scheduled so that the instrumental performance of the experimental group would not suffer during the experiment.

Basic Assumptions

It was assumed that language reading and music sight-reading have certain characteristics in common. To the best knowledge of the

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[15]Oscar K. Buros (ed.), The Mental Measurements Yearbook. Highland Park, N.J.: The Gryphon Press, Vol. 4-6, 1953, 1959, 1965.

investigator, no outside aid was given, either in the area of music or language reading.

Delimitations

This research study included materials relating solely to language reading improvement and its relation to music sight-reading. Language reading improvement encompassed the areas of comprehension and speed. The course Seven Reading Strategies[16] was administered only to the experimental group. The evaluation of sight-reading of music was accomplished with selected etudes from the Watkins-Farnum Performance Scale.[17] Socioeconomic backgrounds and other various indirectly related psychological factors were not dealt with in this particular research.

Need for the Study

According to Katz and Deutsch, " . . . poor reading is associated with (a) difficulties in shifting from one sensory mode to another, ..."[18] They also mention, in summary, that reading retardation and difficulties in attending, memorizing, or learning within particular modes are related. Thus poor readers are prone to show attentional lapses when confronted by simple visual

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[16]K. P. Baldridge, Seven Reading Strategies (Greenwich, Conn.: Baldridge Reading Instruction Materials, 1970).

[17]John G. Watkins, Dr., and Stephen E. Farnum, Dr., The Watkins-Farnum Performance Scale (Winona, Minn.: Hal Leonard Music, Inc., 1954).

[18]Phillis Katz and Martin Deutsch, "Visual and Auditory Efficiency and its Relationship to Reading in Children," Educational Resources Information Center, ED020861. Washington, D. C.: National Education Association, 1967.

stimuli as compared to simple stimuli.[19] These visual attention lapses very possibly have an effect upon the reading of music notation.

In a review of a thesis by Monroe, Young asserted that " . . . similarities between the teaching and learning processes of the language reading program and those of the music reading program have been noted by many music educators through the years."[20]

Harris spoke of a well-balanced reading program and the effect music had on it. She concluded that "the counterpart of eye-span and phrasing . . . may be found in music through the reading of phrases and measures."[21]

In their research on language and music reading, Wheeler and Wheeler concluded that "there are only a limited number of research investigations on the reading of music, and there seem to be none that directly study the relationship of music reading ability to the language reading skill."[22]

Very few studies have been conducted in the area of a correlation of language reading scores and musical sight-reading scores, or from the correlation of these scores involving an experimental improvement course.

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[19]Ibid., p. 45.

[20]W. T. Young, "A Study of Music Reading in Elementary School Utilizing Certain Related Aspects of Language Reading," Council For Research In Music Education Bulletin, No. 18, Fall, 1969.

[21]Janet D. Harris, "Music and Language Reading," Music Educators Journal, XXXIV, (November 1947), 29-30.

[22]Wheeler and Wheeler, op. cit., p. 446.

Definition of terms used

For the purpose of this study, the following terms required definition and are limited as indicated:

Comprehension: In this study, the term, "comprehension," was used to refer to the act, process, or result of grasping ideas, facts, etc., with the mind, or the power of doing so; ability to know; understanding; as to attain a full comprehension of a fact.

Course: The term, "course," as used in this study, denoted a series of connected motions, acts, or events as constituting a unity; as, a course of lectures.

Music Reading: For the purpose of this study, the term, "music reading," was defined as the ability to read and perform music at first sight.

Perception: "Perception" was defined, in this particular study, as a single unified awareness derived from sensory processes while a stimulus is present.

Read: v.t. The term, "read," for this investigation was defined as being able to perceive the form and relations of (characters written or printed); especially to note (such characters) so as to apprehend their significance.

Sight-read: For the purpose of this study, the term, "sight-read," was defined as the ability to read and perform music at first sight.

Student: A person engaged in a course of study served as the definition of "student" in this study.

Study: For the purpose of this investigation, the term "study" was defined as applying the mind to ... any subject of investigation.

Chapter 2

RELATED READINGS

In procuring material related to this study, many findings were obtained from the field of language reading. A few researchers dealt primarily with the skill of language reading and its transference from one mode to another. Katz and Deutsch discovered that

> On what might be considered the least complex of the response measures used, poor readers exhibited greater difficulty in switching from one modality to another than did good readers of the same chronological age. This result suggests that one variable which may underlie reading performance is the capacity to respond quickly to two sequentially presented stimulus modalities. This finding is in accordance with the earlier study of Raab, Deutsch, and Freedman which also found such differences.[23]

Music Reading

A study conducted by Pottenger sought to determine the relationship between rhythm reading skill and certain abilities. The physically sighting of objects, imitative ability (with notation exposed to the imitator), and aural images (as indicated by ability to determine whether or not sounded rhythms correspond to notated rhythms), were abilities being investigated. Tests designed to measure the skills of music reading were administered to a total of fifteen elementary, junior high school, senior high school, and college students. The study indicated that a very high external validity existed for the rhythm reading test at the .001 level and intercorrelation was

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[23]Ibid., p. 37-38.

exhibited among rhythm reading skill (sight and deliberated reading), aural imagery, imitative ability, cognition of notation regarding note-rest beat values, and other related measurements. Age, year in school, length of instrumental music training and length of experience with a specific kind of instrument also had effect on the intercorrelations.[24]

Ray compared the results of testing two different types of drill with pitch patterns. With an experimental group, Ray used the tachistoscope and pitch patterns of varying length and complexity which were not identified with a particular key or mode. The control group was exposed to pitch patterns based directly on keys and modes and omitted drill with the tachistoscope. Subjects were selected from Western Michigan University at random. Fourteen hours of drill in sight-singing were given to each group over a ten-week period. Ray concluded that visual complexity and musical complexity were found to be independent of each other.[25]

Experimentation with music students in which audio prompting, visual prompting, and no prompting in the process of music reading was done by Wood, and the results appeared to be relative to the present investigation. Wood concluded, as a result of testing, that visually prompted students surpassed the others in performance.[26]

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[24]Ibid., p. 43.

[25]Harry B. Ray, "An Experimental Approach to the Reading of Pitch Notation," Dissertation Abstracts, 25:3021, 1964.

[26]Charles H. Wood, III, "An Experimental Study of Prompting in Music Reading," Dissertation Abstracts, 1972.

Psychomotor Abilities and Physical Factors Involved in the Reading Process

Maclean and Kear conducted an investigation of the possible correlation between hand-eye coordination and reading disability. Children from grades two through twelve were tested, using a portable testing device, to determine their hand-eye coordination. Approximately 1,700 normal public school students and 290 students diagnosed by reading clinics as poor readers formed the sample for the experiment. Reading ability was determined through standardized reading tests. After statistical analysis of data, no correlation was discovered between hand-eye coordination and reading disability.[27]

Young studied eye-movement patterns and eye-hand temporal relationships which occurred when successful and unsuccessful piano sight-readers, all highly skilled pianists, sight-read music. The patterns were divided into vertical reading patterns and horizontal (chordal) reading patterns. An eye-movement camera which photographed corneal reflex eye-movement spots superimposed on a viewing screen was used. Moment of performance was recorded by switching mechanisms placed under each of the keys of the piano and attached to a recording oscilloscope. Both groups were found to have irregular general fixation patterns and without constant patterns of ascent or descent throughout the chord. Successful sight-readers were found to have more fixations per event but spent more time rereading the material.

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[27]George Maclean, and Edward Kear, "The Collection and Statistical Evaluation of Quantitative Data for Hand-Eye Coordination with respect to Determining its correlation with Reading Disability at both Primary and Secondary Levels," Educational Resource Information Center, ED020861, 1967.

The unsuccessful sight-readers spent more time viewing chords than did the successful. Young concluded that

> Although the average eye-hand temporal relationship for each group placed the eye about one and one-half chords ahead of the chord being performed, the successful sight-reader had a slightly longer and significantly different eye-hand temporal relationship than that of the unsuccessful piano sight-reader.[28]

Research by Mewes studied the possibility of an association between crossed dominance (preference of one eye over the other) and instrumental music reading. Crossed dominance subjects were thought to perform less well than non-crossed dominance subjects on a music sight-reading test. The Watkins-Farnum Performance Scale and the Harris Test of Lateral Dominance were used to determine instrumental and physical capabilities respectively. One hundred fifty-three subjects were chosen from grade levels five through twelve. The inferrence was made that experience was a more important variable than was crossed dominance on a music reading test. Also, crossed dominance seemed unrelated to a music reading test.[29]

Tachistoscopic Training

Hammer investigated the effect of tachistoscopic training on the development of melodic sight-singing ability. The experiment was conducted using two beginning fourth grade music classes. A method for teaching melodic sight-singing was developed which stressed

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[28]Leonora J. Young, "A Study of the Eye-Movements and Eye-Hand Temporal Relationships of Successful and Unsuccessful Piano Sight-Readers While Piano Sight-Reading," Dissertation Abstracts, 32:5834A, 1971.

[29]Forden E. Mewes, "An Attempt to Determine the Association, if any, Between Crossed Dominance and Achievement Levels in Instrumental Music," Dissertation Abstracts, 31:416A, July, 1970.

a tonal pattern approach. Thirty-one slides were made for use in the tachistoscope and administered to the classes by the investigator. Hammer concluded that the tachistoscopic method produced a distinct improvement.[30]

Research was conducted by Wiley to find the relative effectiveness of tachistoscopic and conventional techniques in the development of the ability to sight-read rhythm patterns in music. Two fifth-grade classes were chosen as subjects and divided into a control group and an experimental group. A measure was constructed and used to determine the degree of rhythmic sight-reading ability of individuals in the groups. While both groups were exposed to the same material, the techniques of presentation differed between groups. The experimental group received tachistoscopic trainig plus conventional training for thirty-three lessons. A posttest was administered, then the situation was reversed and given to the other group. The conclusion was made that tachistoscopic trainig was not more effective than conventional training since both groups apparently made comparable gains.[31]

Houston studied the effect of the use of the reading accelerator on the development of keyboard sight-reading ability. Twenty organ students were chosen as subjects and given a weekly keyboard drill session. The experimental group was forced to read at a certain

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[30]Harry Hammer, "An Experimental Study of the Use of the Tachistoscope in the Teaching of Melodic Sight-Singing," Dissertation Abstracts, 22:3690, 1961.

[31]C. A. Wiley, "An Experimental Study of Tachistoscopic Techniques in Teaching Rhythmic Sight-Reading in Music," Dissertation Abstracts, 23:3925, 1962.

speed while the control group progressed at individual rates of speed. Pretests and posttests were administered to measure keyboard sight-reading ability. Each group made noticeable gains and the difference between the groups was no greater than chance difference. Houston concluded that the use of the tachistoscope was no more effective than conventional methods.[32]

Trismen also deals with these drill machines in a comparison of rhythmic reading achievement of students taught by maximal speed pacing technique and achievement of students taught by a pacing technique which did not require a maximal response rate. The experiment was carried out using sophomore female students enrolled in the Elementary Education Curriculum at the State University of New York Teachers College at Cortland. Experimental and control groups were randomly assigned to the two class sessions of each of two instructors. The experiment was divided into three phases: 1) preliminary, 2) experimental, 3) follow-up. It was concluded that "the maximal speed pacing technique was not . . . superior to the control technique in the teaching of rhythmic reading."[33]

Tachistoscopic training was later investigated by Manzanares in a study in which sixteen university music majors were divided into two groups — a control group and an experimental group. The control group was trained by conventional methods for eight weeks and the

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[32]Oliver Houston, Jr., "An Experimental Study of the Use of the Reading Accelerator in the Teaching of Keyboard Sight-Reading," Dissertation Abstracts, 24:3592, 1963.

[33]D. A. Trismen, "An Experimental Investigation of a Maximal Speed Pacing Technique For Teaching Music Reading," Dissertation Abstracts, 26:5253, 1964.

experimental group by the controlled reader for the same duration. Pretests and posttests were administered and Manzanares concluded that tachistoscopic trainig was no more significant than conventional methods.[34]

Relationship Between Music and Language Reading Abilities

Jones investigated the relationship that perceptual time span, intelligence, music backgroud and verbal reading have to music reading achievement. The sample of 206 students was taken from the grade school, junior-senior high school, and college (music majors and non-music majors) levels. The students viewed one hundred twenty slides of musical and verbal notation. The projectors were set at various speeds, during various sessions, for viewing by the group. Four specific tests were devised -- 1) Notation Copy Test, 2) Performance Test, 3) Listening Test, 4) Verbal Reading Test. It was found in this experiment that " . . . verbal reading ability did not relate significantly with music achievement."[35]

Katz and Deutsch investigated relationships between auditory and visual functioning and reading achievement as well as the influence of developmental factors on these variables. A wide range of visual and auditory skills in poor and normal readers at grades one, three and five were sampled.[36]

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[34]Manzanares, loc. cit.

[35]Howell T. Jones, Jr., "The Relationship of Selected Factors and Music Reading Achievement," Dissertation Abstracts, 29:3632, 1968.

[36]Katz and Deutsch, loc. cit.

The investigators concluded that reading could be affected adversely by any one of the psychological processes of memory, learning, and conception. They also determined that difficulties in attending, memorizing, or learning within particular sensory modes were related to reading retardation.[37]

The same topic was investigated by Wheeler and Wheeler at the University of Miami with somewhat different results. In their experiment, two hundred forty-three pupils in the fifth and sixth grades were fiven language and music reading tests: The Knuth Achievement Test in Music and The Progressive Reading Tests. Scores were correlated taking musical involvement into consideration. The results showed that there seemed to be

> A low positive correlation between music reading and language reading, but the correlations are not high enough to justify an assumption that the techniques involved in reading music are closely related to those in language reading.[38]

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[37]Ibid., p. 45.

[38]Wheeler and Wheeler, loc. cit.

Chapter 3

COLLECTION AND TREATMENT OF DATA

COLLECTION OF DATA

Selection of Subjects

The age range of the test groups was twelve years through seventeen years of age -- grades seven, eight, nine, ten, and twelve. (Grade level eleven was omitted due to insufficient number of students in instrumental music in that particular grade level). Fifty-four male and female instrumental students were taken from University Breckinridge School on the campus of Morehead State University and Rowan County High School, twenty-seven from each. Through consultations with faculty members familiar with each group, the learning abilities of both groups were judged to be fairly even. These conferences involved discussion of intelligence quotient averages and related data. With respect to approximate grade level and instrument type, the University Breckinridge School group was matched student per student with instrumental music students from the Rowan County High School. Music students from the Rowan County High School were used as the control group in this study.

Administration of the Music Pretests and Posttests

A pretest and posttest were given to each individual student in the groups to determine progress in music sight-reading performance

over the duration of the experiment. The measure used was the Watkins-Farnum Performance Scale.[40] The measures were administered, in part, by personnel not involved in the experiment, to prevent possible bias of scores. Both pretest and posttest were identical and administered under similar conditions.

Herbert D. Wing reviewed the performance scale mentioned in the preceding paragraph as being " . . . not only . . . of great practical value in schools in arranging the children in the orchestra or assessing the merit of newcomers, but should also provide a valuable scale for assessing practical ability where this is required in investigations into musical aptitude."[41]

The etudes chosen from the performance scale were selected according to expected average performance abilities of the combined grade levels. The scoring consisted of a sum of errors with one error per measure being allowed. These tests were tape-recorded as they were administered to remove any doubt concerning the number of errors per student. These tapes were studied and checked for any student errors overlooked or counted against the performer erroneously. Progress was calculated by comparing the number of errors in the pretest as opposed to errors in the posttest.

Language Reading Course

A language reading course was administered to the experimental group with emphasis placed on number of words read per minute (speed)

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[40] Watkins-Farnum, loc. cit.

[41] Oscar K. Buros (ed.), The Fourth Mental Measurements Yearbook, Highland Park, N. J.: The Gryphon Press, Vol. 4, 1953, p. 387.

and comprehension of facts. Seven Reading Strategies[42] was employed as the text for language reading improvement course, and several guidelines for improvement of reading abilities were suggested. Phrase reading, eye-movement patterns, and the importance of certain sections of material read were among the matters dealt with in the language reading improvement course. It was the position of the investigator, acting as instructor, to expose different genres of literature (periodicals, textbooks, novels) to the experimental group using the reading techniques and guidelines suggested in the previously mentioned text.

Administration of the Reading Pretests and Posttests

The language reading pretest and posttest was the Diagnostic Reading Test.[43] The test measured the language reading progress of each student in the experimental group by measuring language reading speed and comprehension of facts. According to Albert J. Kingston, mental measurement reviewer, this test needed improvement in the areas of instruction manuals and norm sheets.[44] However, in 1963, a norms booklet was published to supplement the test which helped immensely. Kinston stated that the Committee was to be congratulated for its attempt to measure reading abilities at various grade levels.

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[42]Baldridge, loc. cit.

[43]Committee on Diagnostic Reading Tests. Diagnostic Reading Test, Committee on Diagnostic Reading Tests, Inc., 1963.

[44]Oscar K. Buros (ed.), The Sixth Mental Measurements Yearbook, Vol. 6, 1965, p. 824.

[45]Ibid., p. 824.

Instructional Procedure

The control and experimental groups were taught as separate instrumental music classes. The musical material consisted of concert repertoire typical of the materials used in classes of this sort. The process of sight-reading was not emphasized in the instructional procedure of either class. The class periods for each group were of equal duration and met during the same hour of the day.

TREATMENT OF DATA

The data was treated statistically after all related material had been collected. The mean, median, and standard deviation were established for each test administered. The same procedure was followed for both music and language tests. At this point, it was determined whether a significant difference existed between the pretest-posttest scores of the groups. It was then determined whether or not the language reading course had made a noticeable effect. Both of the above steps were accomplished by using the t-test to compare scores of the particular pretest and posttest.

The scores were compared, using the process mentioned above, until a level of significance was found concerning the effect of a language reading improvement course upon instrumental sight-reading in the grade levels specified earlier. The data was plotted on separate histograms and displayed later in this study.

CONTROL GROUP DATA

Student	Age	Grade	Instrument	Instrumental Scores* Pretest	Posttest
1	12	7	Flute	4	1
2	12	7	Flute	5	6
3	15	9	Flute	2	1
4	14	9	Flute	3	6
5	12	7	Clarinet	13	12
6	12	7	Clarinet	13	11
7	12	7	Clarinet	8	10
8	14	8	Clarinet	12	16
9	15	9	Clarinet	10	9
10	12	7	A. Sax.	6	2
11	16	11	A. Sax.	2	2
12	16	11	A. Sax.	1	3
13	12	7	Trumpet	8	9
14	13	7	Trumpet	15	15
15	13	8	Trumpet	11	15
16	13	8	Trumpet	16	16
17	15	10	Trumpet	9	11
18	17	12	Trumpet	13	11
19	13	8	F. Horn	5	3
20	16	10	Trombone	6	9
21	13	7	Trombone	8	5
22	13	8	Baritone	9	3
23	13	8	Tuba	8	7
24	17	11	Tuba	4	16
25	12	7	Percus. (S.D.)	1	2
26	13	7	Percus. (S.D.)	5	2
27	14	8	Percus. (S.D.)	4	0

*expressed in number of errors made

EXPERIMENTAL GROUP DATA

Student	Age	Grade	Instrument	Inst. Scores* Pretest	Inst. Scores* Posttest	Reading Scores** Pretest	Reading Scores** Posttest
1	12	7	Flute	3	3	316/70	386/66
2	12	7	Flute	4	2	355/58	399/91
3	14	8	Flute	5	1	212/47	568/59
4	16	10	Flute	10	6	308/72	373/77
5	12	7	Clarinet	14	5	325/50	390/61
6	12	7	Clarinet	13	5	303/54	338/63
7	13	7	Clarinet	10	3	260/42	347/51
8	13	8	Clarinet	10	10	312/71	498/79
9	16	10	Clarinet	6	3	273/69	299/81
10	15	10	Clarinet	6	3	312/80	520/87
11	15	9	T. Sax.	4	11	407/72	568/77
12	15	10	A. Sax.	0	0	403/92	628/93
13	17	12	A. Sax.	1	0	472/74	628/90
14	12	7	Trumpet	10	7	195/58	568/62
15	14	8	Trumpet	15	9	308/48	485/58
16	14	8	Trumpet	13	8	256/70	355/82
17	13	8	Trumpet	10	4	238/64	282/75
18	16	10	Trumpet	12	5	429/68	568/84
19	17	12	Trumpet	9	6	568/80	628/90
20	14	9	F. Horn	6	3	273/63	312/57
21	15	10	F. Horn	1	3	251/58	329/59
22	13	8	Trombone	6	2	295/63	568/73
23	15	10	Trombone	5	4	277/65	477/68
24	13	8	Baritone	4	1	286/79	520/93
25	14	8	Tuba	4	5	208/66	568/74
26	12	7	Percus. (S.D.)	16	3	169/48	316/51
27	12	7	Percus. (S.D.)	5	0	182/62	290/72

*expressed in number of errors made

**speed in words per minute (numerator)
comprehension in percentages (denominator)

Statistical Computation Formulae

MEAN: $M = \frac{\Sigma X}{N}$

MEDIAN: the middle score

STANDARD DEVIATION: $S_d = \sqrt{\frac{\Sigma (X - \bar{X})^2}{N}}$

t (independent): $t = \frac{M_1 - M_2}{\sqrt{\frac{X_1^2 + X_2^2}{N_1 + N_2 - 2} \left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$

t (dependent): $t = \frac{\bar{d}}{S_d / \sqrt{N}}$

Chapter 4

PRESENTATION OF FINDINGS

Language Reading Pretest and Posttest Results

A report of the significance of the language reading improvement course is necessary before introducing the comparison of instrumental pretest scores. A chart and discussion of language reading pretest and posttest scores which were administered to the experimental group will follow.

The principal intention of the language reading pretest and posttest was to measure the amount of difference that the reading course had on the experimental group. This was an extremely important measurement in that it concerned the factor under manipulation within the experimental group.

The pretests and posttests were administered during the same time periods to prevent a possible error in measurement. The subjects were aware of administration of the measure prior to the date on which it was given.

The language reading measurement was divided into two specific areas -- comprehension of facts and speed. Comprehension of facts was expressed in terms of percentage of material mentally retained: speed was expressed in terms of the number of words read per minute. Optimum comprehension percentage was 100% and the top reading speed for this particular test was 628 words read per minute.

Table 4.1

READING SPEED* PRETEST AND POSTTEST

	MEAN	MEDIAN	STANDARD DEVIATION
PRE	303	295	89.1
POST	452	471	116.1
DIFFERENCE	149	182	27.8

t -- 7.4 (significant at .001 level of confidence)

*in terms of words read per minute

Table 4.1 indicated that the mean reading speed of the experimental group increased 149 words per minute. The median also had an increase of 182 words per minute. An increase of 27.8 words per minute was indicated when the standard deviations were compared, and the t-score was found to equal 7.4 -- a level of significance greater than .001. These results showed that the reading improvement course influenced the reading speed of the experimental group.

Table 4.2

READING COMPREHENSION* PRETEST AND POSTTEST

	MEAN	MEDIAN	STANDARD DEVIATION
PRE	64	65	11.7
POST	73	74	12.0
DIFFERENCE	9	9	.3

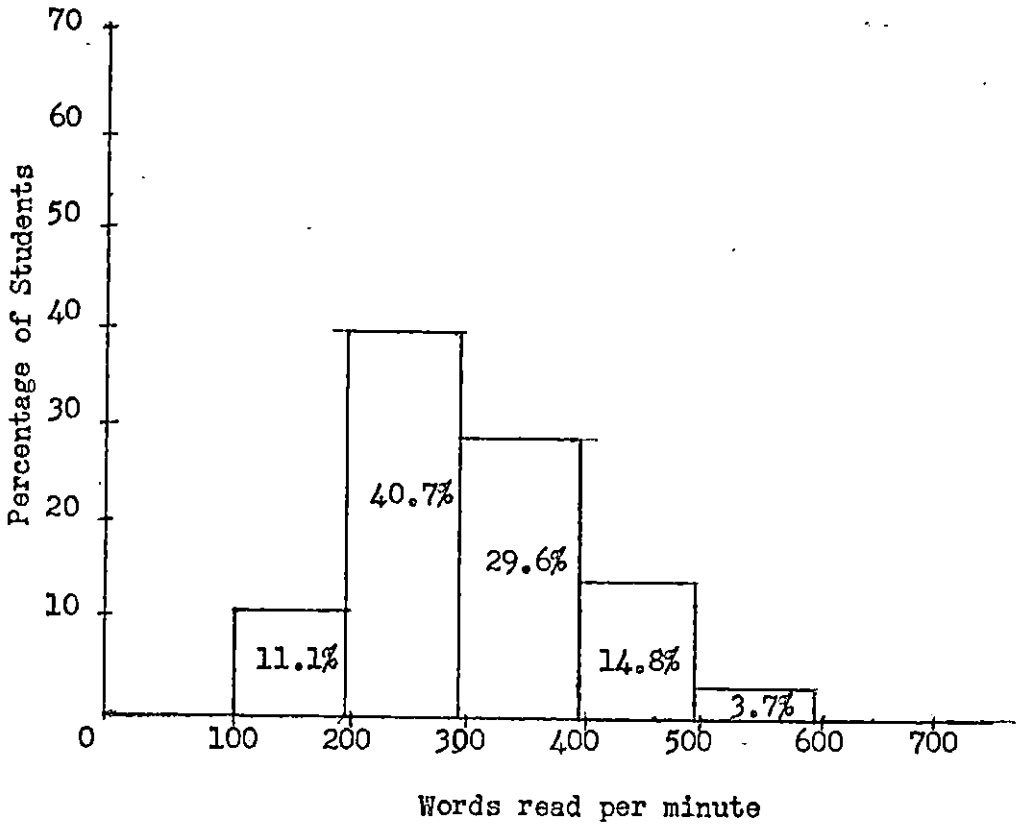
t — 8.3 (Significant at .001 level of confidence)

*expressed in terms of percentage of material mentally retained

In Table 4.2, the same type increase found in Table 4.1 was discovered. Both the mean and median had an increase of 9%. A very slight increase of .30% was noticed in the standard deviations of the two measures being compared, while t was found to equal 8.3. This t-score was established to be greater than the .001 level of significance. The comprehension scores were as highly important as the speed scores.

Table 4.3

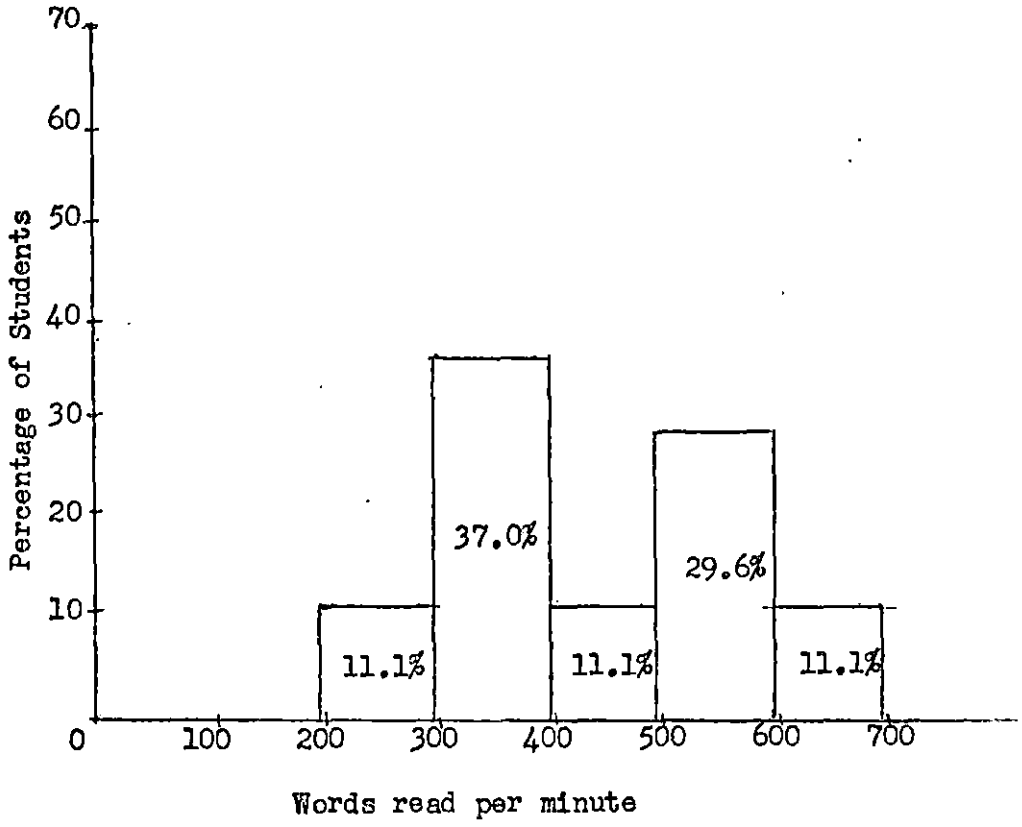
HISTOGRAM OF READING SPEED SCORES (PRETEST)



A distribution, expressed in percentages, of the reading pretest pertaining to speed can be viewed in Table 4.3. A majority of the scores, 40.7%, were produced between 200 and 299 words per minute. 29.6% produced scores lying between 300 and 399 words per minute and the same percentage sum fell between 100-199 and 400-599 words per minute.

Table 4.4

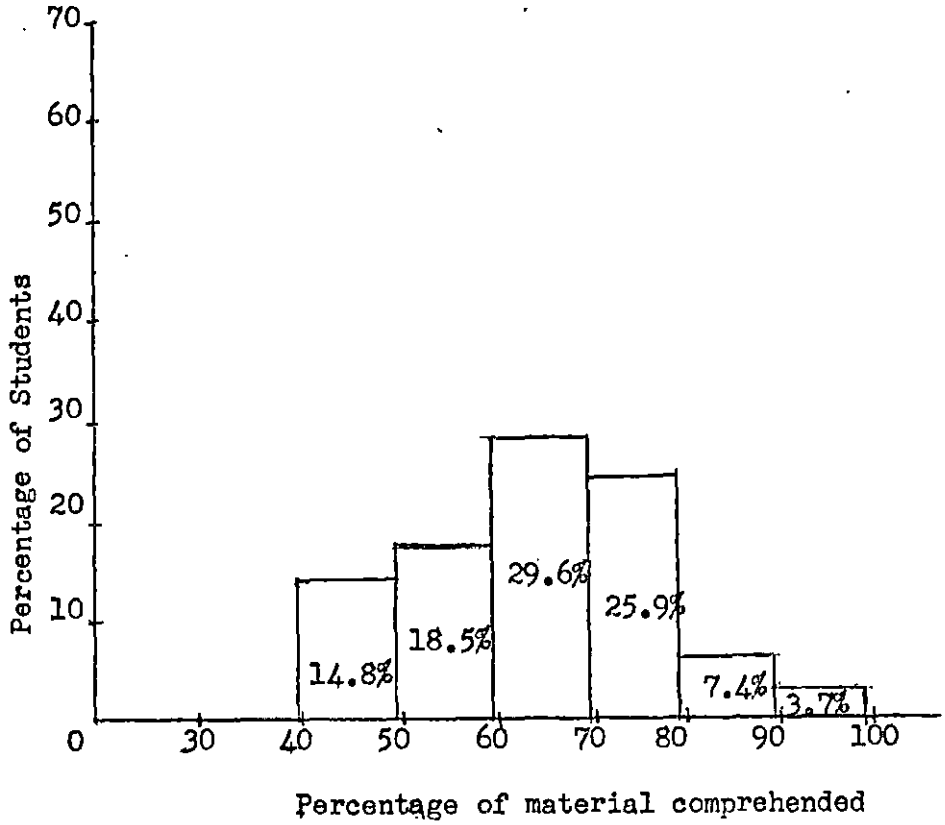
HISTOGRAM OF READING SPEED SCORES (POSTTEST)



In contrast to the speed pretest, the largest percentage of scores in the speed posttest (Table 4.4, 37.0%, fell between 300 and 399 words per minute). Also, 29.6% of the posttest scores came between 500-599 words per minute as opposed to the same percentage in the pretest where the range was 300-399. 33.3% spread equally over three areas on the histogram -- 200-299, 400-499, and 600-699 words per minute. The overall low range on the posttest increased from 100-199 on the pretest to 200-299. The high range increased both in percentage (from 1% to 11.1%) and range (from 500-599 to 600-699).

Table 4.5

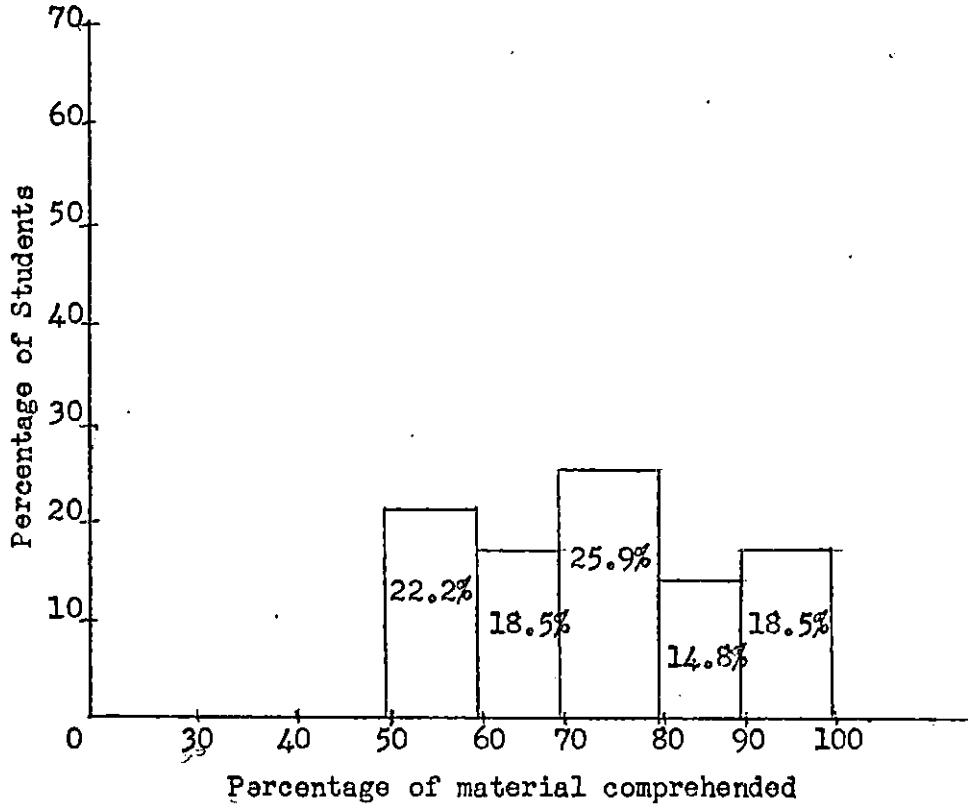
HISTOGRAM OF READING COMPREHENSION SCORES (PRETEST)



Viewing the histogram displaying pretest comprehension scores, (Table 4.5) it was discovered that the range of comprehension was between 40% and 100%. The majority percentage was 29.6% and a range of 60%-69% comprehension. 33.3% of the experimental group obtained 40%-59% while 37% had comprehension percentages between 70% and 100%.

Table 4.6

HISTOGRAM OF READING COMPREHENSION SCORES (POSTTEST)



The low score for the posttest in comprehension (Table 4.6) designated a range from 50%-59% -- a contrast from the low pretest range of 40%-49%. The high score range remained stable at 90%-100% but indicated a sizeable percentage gain of 14.8%. The majority percentage for the posttest was 25.9% and had a score range of 70%-79% comprehension. The majority percentage of scores in Table 4.5 ranged between 50%-69% and 33.3% between 80%-100%.

The above data was considered and the conclusion was made that there had been a significant gain in language reading improvement over the duration of the experiment. This gain was effective in reading speed and comprehension of facts.

Instrumental Pretest and Posttest Results

It was necessary to establish the standings of the control and experimental groups at the beginning of the experimental period. This establishment of group standings was carried out by the use of the t-test. The t-test was used to measure the significance of difference between the experimental group instrumental pretest scores and the pretest scores of the control group. Referring to Table 4.7, the statistics indicated a large degree of equivalence between the two groups. There was a slight difference in the pretest means of .04 errors, the greater mean being that of the experimental group. The median difference was two with the lesser in the experimental group; however, the t-score (.1059) indicated no significant difference between the pretest scores of the control and experimental groups.

Table 4.7 COMPARISON OF INSTRUMENTAL PRETEST SCORES*

	MEAN	MEDIAN	STANDARD DEVIATION
CONTROL	7.44	8	4.25
EXPERIMENTAL	7.48	6	4.50
DIFFERENCE	.04	2	.25

t -- .1059 (no significant difference)

*expressed in number of errors made

Table 4.8

CONTROL PRETEST AND POSTTEST* (INSTRUMENTAL)

	MEAN	MEDIAN	STANDARD DEVIATION
PRE	7.44	8	4.25
POST	7.51	7	4.93
DIFFERENCE	.07	1	.68

t -- 1.1562 (less than .1 level of confidence; not significant)

*expressed in number of errors made

In Table 4.8, the pretest and posttest scores of the control group were compared using the t-test. The means, medians, and standard deviations were also compared. An increase of .07 errors was produced by the posttest scores. The median score decreased by one error. The standard deviation increased .68 and t was 1.1562. t revealed no noticeable loss or gain between the instrumental pretest and posttest of the control group.

Table 4.9

EXPERIMENTAL PRETEST AND POSTTEST* (INSTRUMENTAL)

	MEAN	MEDIAN	STANDARD DEVIATION
PRE	7.48	6	4.50
POST	3.77	3	2.72
DIFFERENCE	3.71	3	1.78

t -- 6.428 (significant at .001 level of confidence)

*expressed in number of errors made

Table 4.9 displays the experimental pretest and posttest scores in the same manner as Table 4.8. There was a standard deviation decrease of 1.78 errors from 4.50 to 2.72 in the posttest. The mean dropped from 7.48 in the pretest to 3.77 errors in the posttest -- a difference of 3.71. The median decrease was three. t was found to be 6.428 which is a level of significance greater than .001. The use of the t-score indicated a highly significant difference between the instrumental pretest and the posttest scores of the experimental group.

Table 4.10

COMPARISON OF INSTRUMENTAL POSTTESTS*

	MEAN	MEDIAN	STANDARD DEVIATION
CONTROL	7.51	7	4.93
EXPERIMENTAL	3.77	3	2.72
DIFFERENCE	3.74	4	2.21

t -- 10.71 (significant and .001 level of confidence)

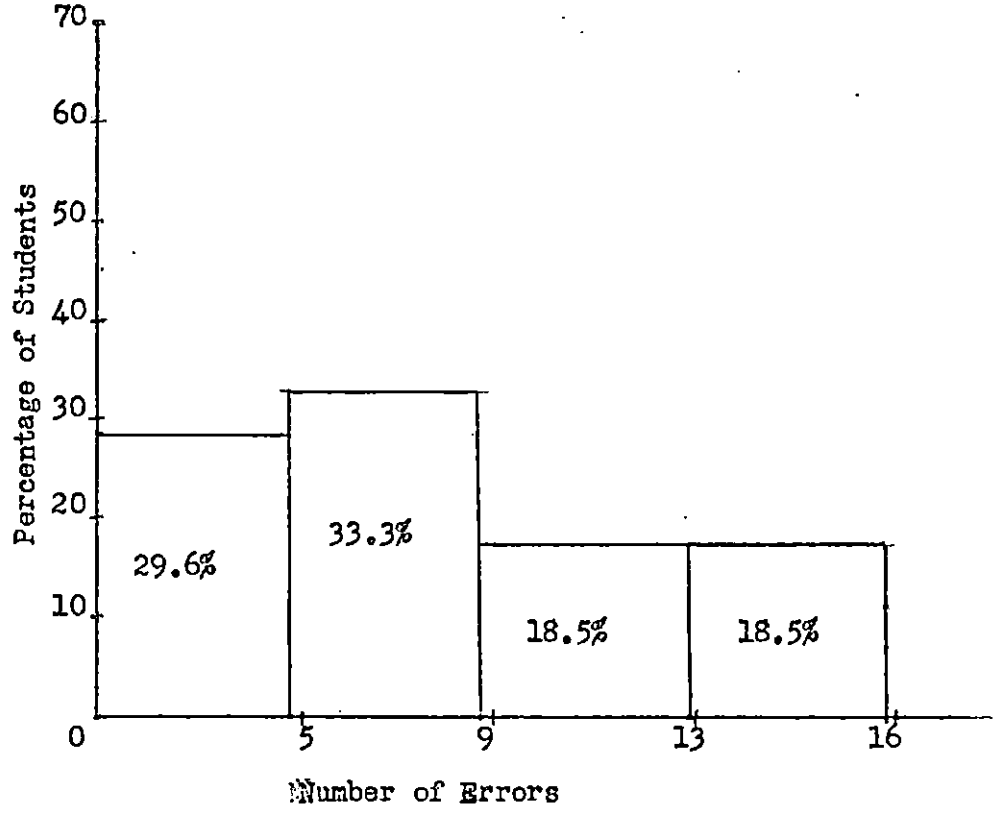
*expressed in number of errors made

The comparison of the instrumental posttest scores (Table 4.10) of both the experimental and control groups was an exceedingly prominent one in the destiny of this research study. The posttests were examined in the manner in which the pretests were compared. The control group had a mean of 7.51 errors as opposed to the 3.77 error mean in the experimental group. The standard deviation difference was 2.21 errors (control -- 4.93 errors; experimental 2.72).

The data in the above comparison expressed a meaningful difference between the control and experimental groups.

Table 4.11

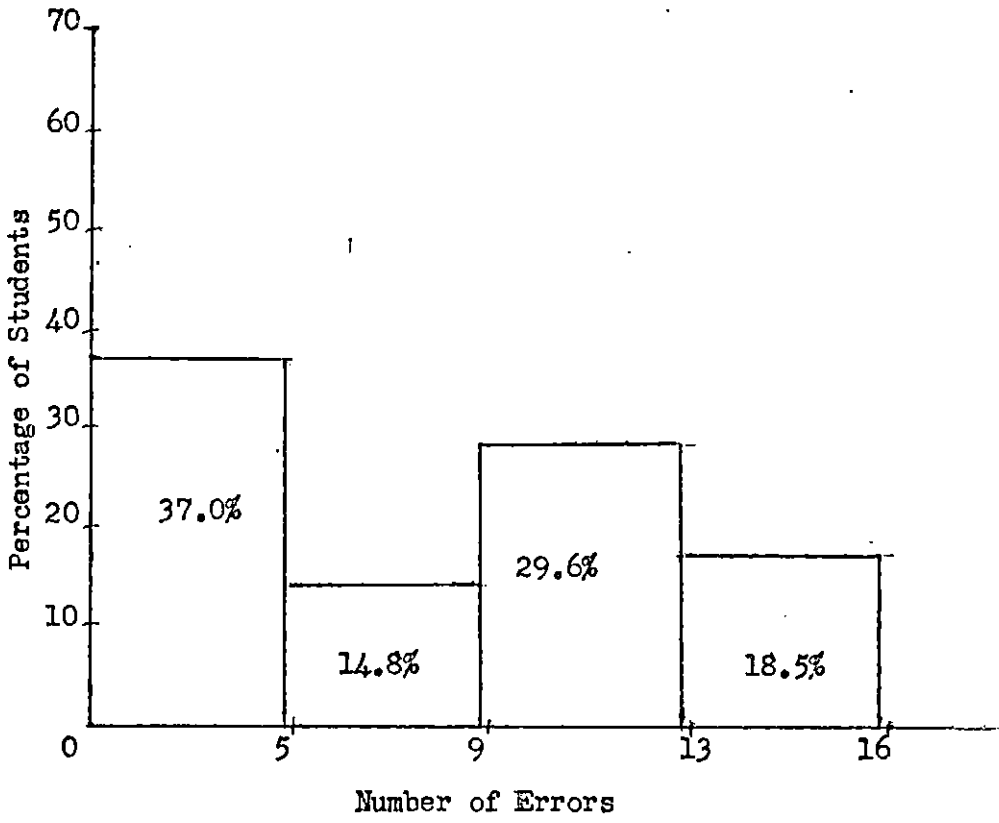
HISTCGRAM OF CONTROL INSTRUMENTAL SCORES (PRETEST)



In referring to Tables 4.11 and 4.13, 29.6% made 0-4 errors in both groups on the pretest. A small difference of 7.4% is found between the two groups in the range of 5-8 errors. The span of 9-12 errors denoted a 7.4% difference and both had 18.5% committing 13-16 errors. These results inferred a fairly equal selection of samples for the research.

Table 4.12

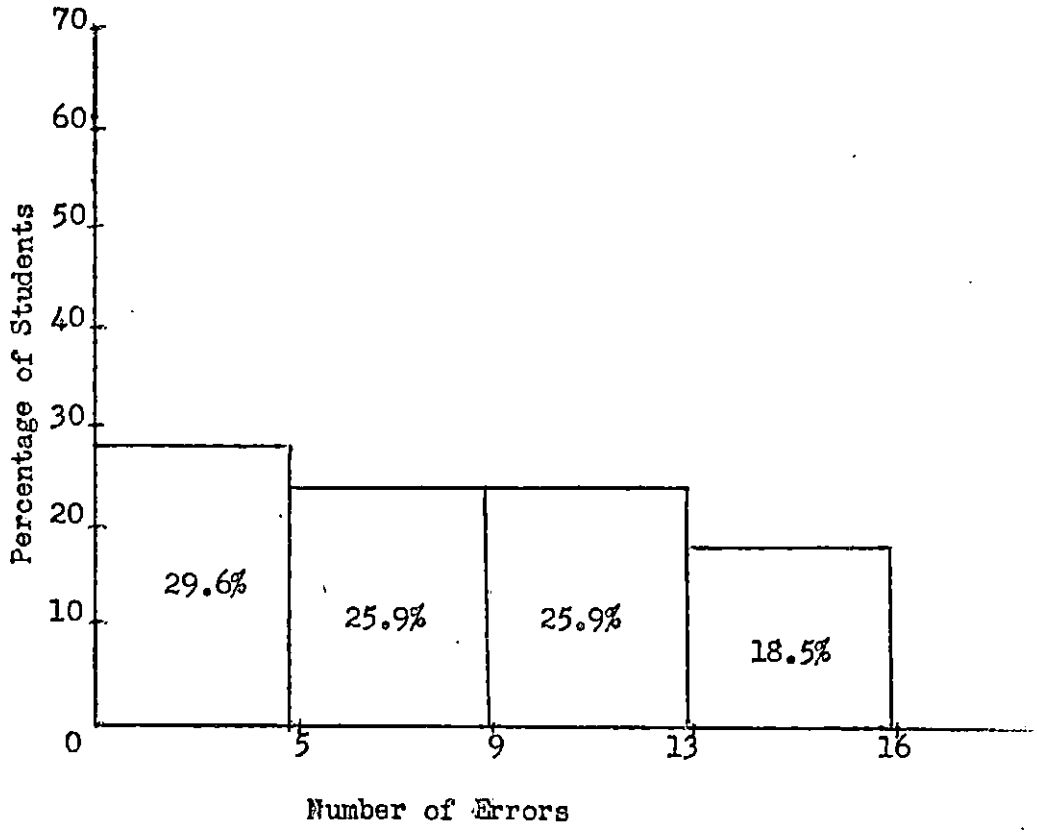
HISTOGRAM OF CONTROL INSTRUMENTAL SCORES (POSTTEST)



Tables 4.11 and 4.12 demonstrated that a 7.4% error gain was produced by the control group in the limits of 0-4 errors. A loss of 18.5% occurred between 5-8 errors. 11.1% was the gain in the number performing between 9-12 errors and the range between 13-16 errors remained stable at 18.5%.

Table 4.13

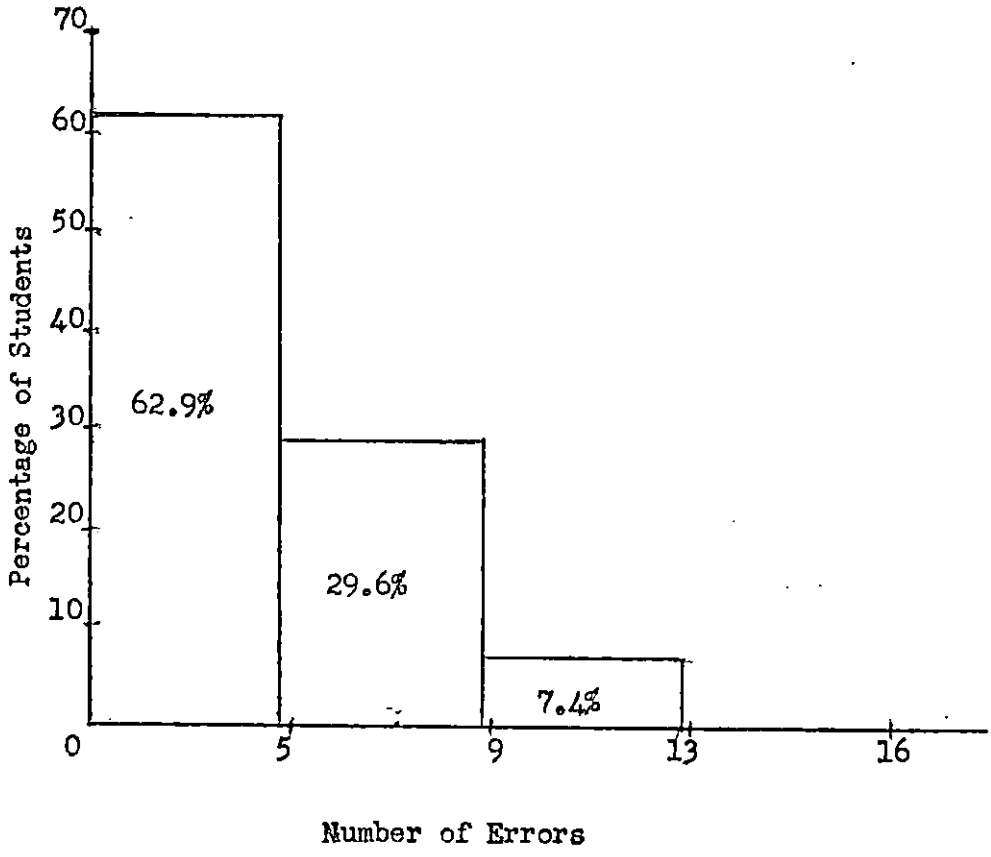
HISTOGRAM OF EXPERIMENTAL INSTRUMENTAL SCORES (PRETEST)



Considering the experiment histograms, Tables 4.13 and 4.14 showed an increase in the number of persons making 0-5 errors from 26.9% to 62.9% producing a difference of 33.3%. There was a 3.7% increase in the 5-8 error range and an 18.5% decrease between 9 and 12 errors. The uppermost range of errors, 13-16, had a decrease from 18.5% in the pretest to 0% in the posttest -- a decrease of 18.5%. The comparison of these percentages support the evidence of a significant difference in experimental pretest and posttest scores.

Table 4.14

HISTOGRAM OF EXPERIMENTAL INSTRUMENTAL SCORES (POSTTEST)



In a comparison of Tables 4.12 and 4.14, the experimental group gained 25.9% over the control in 0-4 errors. A 28.12% increase was made by the experimental between the error range of 5-8. Control gained, however, 22.2% in the limits of 9-12 and retained the gain through the 13-16 error range by having 18.5% of the group there. The experimental group had 0% in the same range.

Chapter 5

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

SUMMARY

An experiment was conducted to investigate the possibility of a significant relationship between language reading and music sight-reading in grades seven, eight, nine, ten, and twelve using instrumental musicians. A control group and an experimental group were used for the research. The experimental plan was to administer a language reading improvement course to the experimental group and leave the control group totally to their usual music education plan. The experimental group also participated in a normal music class situation. The variable was the reading course and its effect upon the sight-reading of music.

Pretests and posttests were given as required, statistically significant differences were found between results of the following measures:

1) language reading pretest and posttest
2) experimental group instrumental pretest and posttest
3) experimental group instrumental posttest and control group instrumental posttest

A significant relationship between language reading and music sight-reading in grades seven, eight, nine, ten, and twelve, using instrumental musicians was established, and the null hypothesis was rejected.

CONCLUSION

The null hypothesis established that there was no significant relationship between language reading ability and the physical notation recognition performance process as encountered during the sight-reading of music literature by instrumental musicians in grades seven, eight, nine, ten, and twelve. In view of the statistical findings which resulted from this research, a rejection of the null hypothesis seemed in order. The investigator suggested a conditional proposition that there seemed to be a significant relationship between the two factors around which this research was established.

It was realized by the investigator that the results of the measures administered in this study were subject to positive and negative variance, and were dependent on many conditions not considered in this particular research.

RECOMMENDATIONS

The researcher considered the recommendations listed below to be essential to the further exploration of this research topic.

It was recommended that:

1) larger periods of reading improvement courses be conducted in the experiment;
2) larger groups be selected for experimentation;
3) the results of this study be used to possibly improve methods used in this facet of music education.

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